

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1-16. (Cancelled).

17. (Original) A method of forming an imide hydrogen storage material represented by the formula, $M^c(NH)^{-2}_{c/2}$, comprising: reacting an amide $MI^d(NH_2)_d^{-1}$ with a hydride MII^fH_f ; where M, MI and MII represent cationic species other than hydrogen; and c, d, and f respectively represent average valence states of respectively said M, MI and MII.

18. (Original) The method of Claim 17 where the amide is lithium amide, the hydride is lithium hydride, and the imide is lithium imide.

19. (Original) The method of Claim 17 wherein M, MI and MII are each independently selected.

20. (Original) A method of making an imide hydrogen storage material represented by $M^c(NH)^{-2}_{c/2}$, comprising: reacting a nitride represented by the formula $MIII^gN_{3/g}$ with an amide represented by $MI^d(NH_2)^{-1}_d$, where M, MI and MIII represent cationic species other than hydrogen, and c, d and g represent average valence states of respectively said M, MI and MIII.

21. (Original) A method for forming an imide hydrogen storage material represented by $M^c(NH)^{-2}_{c/2}$, comprising: heating an amide compound represented by $MI^d(NH_2)_d^{-1}$ for a time and at a temperature sufficient to produce reaction product comprising said imide material and ammonia (NH_3); and separating at least a portion of said ammonia from said reaction product to provide said imide material; where M and MI represent cationic species other than hydrogen, and where c and d represent average valence states of respectively M and MI.

22. (Currently Amended) A hydrogen storage composition having [a] an initial hydrogenated state and a subsequent dehydrogenated state:

(a) in said initial hydrogenated state, said composition comprises an amide and a hydride; and

(b) in said subsequent dehydrogenated state, said composition comprises an imide.

23. (Original) The composition of Claim 22 wherein said imide is represented by the formula Li_2NH .

24. (Original) The composition of Claim 22 wherein said amide is represented by the formula LiNH_2 .

25. (Original) The method of Claim 22 wherein said hydride is represented by the formula LiH .

26. (Currently Amended) A method of producing a source of hydrogen gas comprising: liberating hydrogen from a hydrogenated composition comprising an amide and a hydride by heating said composition at an elevated temperature sufficient to evolve hydrogen gas therefrom thereby producing dehydrogenated product; and then regenerating said hydrogenated composition by exposing said dehydrogenated product to hydrogen gas.

27. (Original) The method of Claim 26 wherein said dehydrogenated product comprises imide.

28. (Original) The method of Claim 26 wherein said liberating of hydrogen is conducted at an elevated temperature greater than about 125°C.

29. (Original) The method of Claim 26 wherein said liberating of hydrogen is conducted at an elevated temperature greater than about 150°C.

30. (Currently Amended) The method of Claim 26 ~~related when~~ wherein said regenerating is conducted at an elevated pressure.

31. (Original) The method of Claim 26 wherein said regenerating is conducted at an elevated pressure greater than about 10 kPa.

32. (Original) The method of Claim 26 wherein said regenerating is conducted at an elevated pressure greater than about 200 kPa.

33. (New) A method of cycling hydrogen comprising:
mixing together at least two distinct hydrogen-containing compounds in particle form
and heating said particles to release hydrogen and form an imide; and then storing
hydrogen by reacting hydrogen with said imide to form at least one of said two distinct
hydrogen-containing compounds.

34. (New) The method of Claim 33 wherein said at least two distinct
compounds comprise an amide and a hydride.

35. (New) The method of Claim 33 wherein said imide is represented by
 $M^c(NH)^{-2}_{c/2}$, where M represents at least one cationic species other than hydrogen and c
represents an average valence state of M.

36. (New) The method of Claim 33 wherein said at least two distinct
compounds comprise a first compound represented by $MI^d(NH_2)_d^{-1}$ (amide) and a
second compound represented MII^fH_f (hydride), where MI and MII respectively
represent cationic species or a mixture of cationic species other than hydrogen, and d
represents an average valence state of MI and f represents an average valence state
MII.

37. (New) The method of Claim 33 wherein said imide is lithium imide
represented by Li_2NH and said distinct compounds comprise a first compound
represented by $LiNH_2$, and a second compound represented by LiH .

38. (New) The method of Claim 35 wherein M comprises an element selected from the group consisting of Ba, Ca, Eu, La, Li, Mg, Sr, Th and mixtures thereof.

39. (New) The method of Claim 34 wherein said imide is represented by the formula MgNH , said amide is represented by the formula $\text{Mg}(\text{NH}_2)_2$ and said hydride is represented by the formula MgH_2 .

40. (New) The method of Claim 36 wherein said M, MI and MII are each elements independently selected.

41. (New) The method of Claim 40 wherein said M, MI and MII are each elements independently selected from the group consisting of CH_3 , Al, As, B, Ba, Be, Ca, Cd, Ce, Cs, Cu, Eu, Fe, Ga, Gd, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Na, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Se, Si, Sm, Sn, Sr, Th, Ti, Tl, W, Y, Yb, Zn, Zr, and mixtures thereof.

42. (New) The method of Claim 40 wherein said M, MI and MII are each elements independently selected from the group consisting of Ba, Be, Ca, Cs, Eu, In, K, La, Li, Mg, Na, Ni, Rb, Sm, Sr, Yb, and mixtures thereof.

43. (New) The method of Claim 40 wherein said M, MI and MII are each elements independently selected from the group consisting of Ba, Ca, Eu, La, Li, Mg, Sr, Th, and mixtures thereof.

44. (New) The method of Claim 40 wherein said M, MI and MII are each elements independently selected from the group consisting of Ba, Ca, Si, Sr, Th, Ti, Zr, and mixtures thereof.

45. (New) The method of Claim 40 wherein said M, MI and MII are each elements independently selected from the group consisting of Al, Ba, Be, Ca, Ce, Cs, Eu, Ga, Gd, In, K, La, Li, Mg, Mn, Na, Nd, Pb, Rb, Si, Sm, Sn, Sr, Y, Yb, Zn, and mixtures thereof.

46. (New) The method of Claim 40 wherein M, MI and MII are each elements independently selected from the group consisting of Al, Be, B, Mg, Li and mixtures thereof.

47. (New) The method of Claim 33 wherein said particles are mixed together by milling.

48. (New) A hydrogen storage system having a hydrogenated state and a dehydrogenated state:

- (a) said hydrogenated state comprises a first group of particles containing an amide and a second group of particles containing a hydride; and
- (b) said dehydrogenated state comprises an imide.

49. (New) The system of Claim 48 wherein said hydrogenated state is a first condition, said dehydrogenated state is a second condition and wherein a third condition is a hydrogenated state comprising at least one of an amide and a hydride.

50. (New) A source of hydrogen comprising particles containing amide and particles containing hydride.

51. (New) The source of Claim 50 where the amide is lithium amide and the hydride is lithium hydride.